CLAIMS

1) Fuel injection system of the common rail type comprising a plurality of injectors (2), a common channel (3) that supplies the fuel under pressure to the injectors (2), a high-pressure pump (4), which supplies fuel to the common channel (3) and is provided with a device (6) for regulating the flow rate and a control unit (7) capable of keeping the pressure of the fuel within the common channel (3), moment by moment, equal to a desired value that generally varies over time; the control unit (7) being coupled to the regulation device (6) in order to control the flow rate of the high-pressure pump (4) so as to supply the common channel (3), moment by moment, with the amount of fuel required in order to have the desired value for pressure inside said common channel (3); the control unit (7) comprising a sensor (11) that is capable of recording the value for the pressure of the fuel inside the common channel (3), and is capable of regulating the flow rate of the high-pressure pump (4) by means of a feedback control using as a feedback variable the value for the pressure of the fuel inside the common channel (3); the high-pressure pump (4) comprising at least one cylinder (12) provided with a piston (13) having an alternating motion inside the cylinder (12), an intake channel (14), a discharge

channel (15) connected to the common channel (3), an intake valve (16) coupled to the intake channel (14) and capable of allowing a flow of fuel to pass into the cylinder (12), and a single-direction delivery valve (17) coupled to the discharge channel (15) and capable of allowing a flow of fuel only out of the cylinder (12); the regulation device (6) being coupled to the intake valve (16) in order to keep the intake valve (16) open when the piston (13) is in a compression phase and therefore to allow fuel to flow back out of the cylinder (12) through the intake channel (14); the intake valve (16) comprising a valve body (18) moveable along the intake channel (14) and a valve seat (19) that is capable of being acted upon in a fluid-tight manner by the valve body (18) and is arranged at the end of the intake channel (14) opposite the end communicating with the cylinder (12); the regulation device (6) comprising a control member (24) that is coupled to the valve body (18) and is moveable between a passive position, in which it allows the valve body (18) to act in a fluid-tight manner upon the valve seat (19), and an active position, in which it does not allow the valve body (18) to act in a fluid-tight manner upon the valve seat (19); the regulation device (6) comprising an electromagnetic actuator (25) that is coupled the control member (24) in

order to move said control member (24) between the passive position and the active position; the system (1) being characterised by the fact that the electromagnetic actuator (25) is driven by means of a pulse of current of short and constant duration.

2) System according to Claim 1, in which the intake valve (16) is open and the delivery valve (17) is closed when the cylinder (12) is in an intake phase in order to supply the cylinder (12) with a given, constant amount of fuel, while the intake valve (16) is closed and the delivery valve (17) is open when the cylinder (12) is in a delivery phase in order to supply fuel under pressure to the common channel (3); the control unit (7) being capable of keeping the intake valve (16) open during an initial part of the delivery phase of the cylinder (12) in order to discharge through the intake conduit (14) the amount of fuel present in the cylinder (12) that exceeds the amount of fuel required in order to have the desired value for pressure inside said common channel (3).

3) System according to Claim 1, in which the intake valve (16) comprises a respective spring (20) capable of pushing the valve body (18) towards a fluid-tight engaged position of the valve seat (19).

4) System according to Claim 1, in which the

control member (24) is moveable between the active position and the passive position along a linear distance parallel to the direction of flow of the fuel through the intake channel (14).

5) System according to Claim 1, in which the electromagnetic actuator (25) comprises a spring (26) capable of keeping the control member (24) in the active position, and an electromagnet (27) capable of moving the control member (24) into the passive position.

6) System according to Claim 1, in which the delivery valve (17) comprises a valve body (21) moveable along the discharge channel (15) and a valve seat (22) that is capable of being acted upon in a fluid-tight manner by the valve body (21) and is arranged at the end of the discharge channel (15) communicating with the cylinder (12).

7) System according to Claim 6, in which the delivery valve (17) comprises a respective spring (23) capable of pushing the valve body (21) towards a fluid-tight engaged position of the valve seat (22).

8) System according to Claim 1, comprising a low-pressure pump (8) capable of supplying the fuel from a tank (9) to the high-pressure pump (4) by means of a tube (10), along which an overpressure valve (29) connected to the tank (9) is inserted.